REMARKS

This is in response to the Office Action mailed on December 11, 2006. In the Office Action, claims 1-54 were pending and rejected.

This communication further follows a telephone conversation with Examiner Vo and the undersigned Attorney on February 2, 2007. The undersigned respectfully thanks Examiner Vo for his time and consideration in the interview.

The issues discussed in the interview were the rejections based on 35 U.S.C. § 101 and 35 U.S.C. § 102(b) in relation to U.S. Pat. 5,477,450 of Takeda et al. With respect to the § 101 rejection, Applicants have amended claims 1 and 24 as suggested by Examiner Vo. Accordingly, it is believe that claims 1-41 are now in condition for allowance. With respect to the § 102(b) rejection, the undersigned Attorney advanced the arguments provided below. Examiner Vo raised, for the first time, references to "Alignment of Shared Forests for Biliingual Corpora" by Meyers et al. and "Review Article: Example-based Machine Translation" by Somers. These references have been reviewed; however, it is not understood how they could be used as the basis of rejecting any of the pending claims. Accordingly, it is believed claims 42-54 are allowable for at least the reasons set forth below.

Claims 1-41 stand rejected under 35 U.S.C. § 101 as being allegedly being directed toward non-statutory subject matter. Applicants have amended independent claim 1 to more particularly point out and distinctly claim the invention. As amended, claim 1 is directed toward a "computer-implemented method of associating dependency structures from two different

languages in a tangible computer readable medium." The recited method includes the steps of "associating nodes of the dependency structures to form tentative correspondences on the tangible medium," "aligning nodes of the dependency structures as a function of at least one of eliminating at least one of the tentative correspondences and structural considerations on the tangible medium," and "providing an output from a computer indicative of the alignment of the dependency structures." (Emphasis added.)

In the Office Action, it is stated that "a claimed computer readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory." Applicants respectfully submit that the clarifying amendments made herein to claim 1 provide a method with data structures that are encoded on a computer readable medium ("associating dependency structures from two different languages in a tangible medium"). Steps performed in the method recited in claim 1 define structural and functional relationships between the data structure and the computer software and hardware components ("form tentative correspondences in the tangible medium" and "eliminating at least one of the tentative correspondences and structural considerations in the tangible medium"). An output is provided that is indicative of these steps taken to align of the dependency structures. Thus, the Applicants respectfully submit that the recited subject matter of independent claim 1 and claims 2-23, which depend from claim 1, are directed toward statutory subject matter.

Independent claim 24 has likewise been amended so that it is directed toward a "computer-implemented method of associating dependency structures from two different languages stored on a tangible computer readable medium." Applicants respectfully submit that the clarifying amendments made herein to claim 24 provide a method with data structures that are encoded on a computer readable medium ("associating dependency structures from two different languages stored on a tangible medium in a computer"). Furthermore, the steps recited in claim 24 define structural and functional relationships between the data structure and the computer software and hardware components ("aligning nodes of the dependency structures with correspondences in the tangible medium"). In addition, an output is provided from a computer that is indicative of the operations performed in the tangible medium. Applicants thus respectfully submit that independent claim 24 and claims 25-40, which depend from claim 24, are likewise directed toward statutory subject matter. Withdrawal of the rejection is respectfully requested.

Claims 42-54 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Pat. No. 5,477,450 of Takeda et al. (hereinafter "Takeda"). Applicants respectfully traverse the rejection.

Independent claim 42 is directed toward a computer readable media having information stored thereon for use by a computer-implemented machine translation system to translate a text input from a first language to a second language. The stored information comprises a plurality of mappings. At least some of the mappings correspond to "dependency structures of the first language having varying context with some common elements, and associated dependency structures of the second language to the

dependency structures of the first language also having <u>varying context</u> with some common elements."   (Emphasis added.)

Claim 42 explicitly recites both an input text and stored information, thereby reciting that the stored information having the mappings is separate from the input text to be translated.   In fact, the stored information, which has mappings indicative of dependency structures of the first and second language is provided "for use by a computer-implemented machine translation system to translate" the text input.   In addition, the mappings have dependency structures with elements that have "varying context."   In other words, the dependency structures in each of the first and second language in the stored information have context, and that common elements in different mappings are provided in varying contexts. Applicants submit that the Takeda reference fails to teach or suggest all of the recited elements of claim 42.

In a response to previous arguments made by the Applicants, the Final Office Action states, on page 2, that Takeda analyzes "the input text to determine a one-for-many correspondence to the constituents by a graph structure". Applicants respectfully submit that how the text input is analyzed is irrelevant to the mappings recited in claim 42.   As discussed above, the mappings in claim 42 are part of stored information "for use by a computer-implemented machine translation system" to translate a text input and are completely separate from the text input itself.   Therefore, the Applicants submit that teaching of the form of a text input in Takeda or any type of structure that the text input may take during the translation process is not relevant to the features recited in claim 42.

Furthermore, the Applicants respectfully submit that language cited in Takeda for the proposition that Takeda teaches the mappings recited in claim 42 expressly disclaims exactly what the Final Office Action asserts that it teaches. Takeda teaches that

> [t]he input text analyzer 14 of this embodiment represents a structure obtained through analyzing an input text not by a tree structure wherein the main element has a one-for-many correspondence to the constituents but by a graph structure. The graph structure expresses modificatory relations, such as a dependency structures or case structures, with regard to an input text and information concerning the syntactic roles of the text, words, or phrases, more concretely by means of nodes corresponding to the words or phrases and edges representing the modificatory relations. Such a text represented by a graph structure is then output from the input text analyzer 14 to the equivalent selector 20. (Emphasis added)

(Takeda, col. 6, l. 60 to col. 7, l. 4.) Thus, while the Office Action asserts that Takeda teaches a one-for-many correspondence, the plain language of Takeda states very clearly that the input text is not a tree structure wherein the main element has a one-for-many correspondence to the constituents. The output of the text analyzer is a single graph structure representing the input text and there is no apparent teaching of a "one-to-many" correspondence.

Applicants believe that there is no other teaching or suggestion of a dependency structure in the first language within the Takeda reference. In fact, there is no explicit teaching of any text in the first language other than the input text. It is suggested, however, that the bilingual dictionary has text in the first language. Indeed, as is admitted on page 2 of the Final Office Action, the selection of words in the second language is

performed by the bilingual dictionary. Applicants submit, however, that no teaching exists to indicate that the bilingual dictionary in Takeda has a dependency structure in the first language, nor is there any suggestion that such as dependency structure is mapped to a dependency structure in the second language.

The Office Action asserts on page 3 that the Bilingual translation information table in column 7 of Takeda indicates a mapping of a "source language and target language … where each word in the source language corresponds to more than one word[] in the target language." The Applicants point out, however, that the words in the second language are not mapped to a dependency structure that is part of stored information and is separate from the text input. Rather, the words in the target language are mapped to the text input. This is not what is recited in claim 42. Furthermore, it is not enough to map words in one language to another language. The mapping recited in claim 42 is a "dependency structure", which Takeda itself recognizes is a "a representation of the structure of a text in terms of dependency between the main element of the text and the other constituents." (See Takeda, col. 6, ll. 45-47.)

In fact, the applicants submit that Takeda is directed toward a substantially different type of translation system. As discussed above, Takeda teaches manipulating the input text in an input language into a graph structure. Then, Takeda assigns potential meanings to the words in the graph structure in a translated language from a bilingual dictionary. (See, e.g., Takeda, col. 7, ll. 34-37.) A word in the input text may have several different meanings in the translated language. Takeda teaches a constraint solver that can eliminate some combinations

in the translated language that are "incapable of being solutions." (*Id.* at col. 9, ll. 67.) <u>The constraint solver has no apparent mapping with associations between the input language and the translated language.</u> Instead, the constraint solver appears to function independent of the input language.

The Office Action asserts that in col. 10, ll. 5-17 Takeda teaches the recited mappings including associations of dependency structures because certain combinations of words that need to be resolved by the constraint solver can have different contexts. However, Applicants believe that Takeda is merely teaching the resolution of different words in the translated language selected from a bilingual dictionary into a narrowed down list of alternatives based on whether the words have a probability of being associated together in the translated language. As discussed above, the constraint solver used to narrow down the list of acceptable alternatives has no apparent association at all with the input language. Thus, not only does Takeda fail to provide any teaching of a plurality of mappings, it provides no teaching of a single mapping that associates a dependency structure in a first language with one in a second language for use in translating input text. Nor does it teach that some mappings correspond to dependency structures of the first language having varying context with some common elements and dependency structures of the second language with the same.

The invention recited in claim 42 has some important advantages. The stored mappings provide a training function for the machine translation system. By providing stored information having mappings between the first language and the second language with overlapping context, fluency and general applicability of the mappings is maintained by the machine

translation system. In particular, it is possible to translate from the first language to the second language even if a particular text to be translated is not in the mappings. In addition, large mappings provide a more fluent translation between the first language and the second language. Takeda does not contemplate a system of this type and cannot provide these kinds of advantages.

For at least these reasons, the Applicants submit that claim 42 is allowable over Takeda. Claims 43-54 depend directly or indirectly from claim 42 and are believed to be separately patentable. Withdrawal of the rejection is respectfully requested.

In view of the remarks and amendments made herein, Applicants submit that claims 1-54 are allowable over the cited art. Entry of this Amendment and a Notice of Allowance for the pending claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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